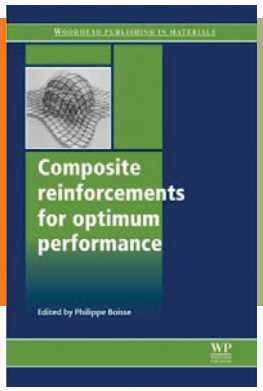

Composite reinforcements for optimum performance
Philippe Boisse, Editor

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The fundamental basis of materials science is in understanding the relationship between the microstructure of materials and their macroscopic properties. Unlike traditional materials, which are usually treated as homogeneous and isotropic, fiber-reinforced composites can be highly anisotropic depending on the localized orientation of fibers. For fiber composites, researchers are very heavy-handed with the microstructure in that they can control the internal structure during the composites manufacturing process through inducing fiber orientation during lay-up or bending and twisting the fibers using textile techniques. The book *Composite reinforcements for optimum performance* is aimed at addressing this interrelationship between the composite microstructure and the resulting properties and performance.

The book is structured into four primary sections: materials for reinforcements in composites; structures for reinforcements in composites; properties of composite reinforcements; and characterizing and modeling reinforcements in composites. The first section highlights the common fiber reinforcements and their properties, along with a section addressing carbon nanotubes as an emerging reinforcement. The information contained in this section is fundamental to most textbooks on fiber-reinforced composites and is presented in a clear and straightforward way.

The second section focuses primarily on textile preform structures for composites, addressing woven and braided structures in both two-dimensional and three-dimensional configurations and modeling their geometric properties. This section is comprehensive in that it covers the textile forming technology and the resulting fabric architectures and composite properties.

The third section addresses the properties of the textiles and composites and highlights both experimental and modeling efforts. The final section examines the characterization of and modeling of composites. It also includes chapters on modeling the mechanical properties at varying scales and modeling of different manufacturing processes, such as of resin transfer molding, injection molding, and fabric draping/forming processes.

As with many books where multiple authors contribute individual chapters, there often is some overlap. However, *Composite reinforcements for optimum performance* covers appropriate breadth and depth on a wide variety of topics that are not often found within a single reference. The treatment of textile composites, from a manufacturing, modeling, and characterization viewpoint is particularly strong. Two chapters in the book address discontinuous fiber composites composed of either carbon nanotubes or short fibers. Both chapters deal primarily with processing in terms of examining flow-induced orientation. The book, while already rather long, would benefit from a chapter on the mechanics of discontinuous fibers and composites.

At the University of Delaware, I teach an advanced undergraduate and graduate-level course on composite materials, and I think that this book is an excellent reference for both scientists and engineers working with, or studying, fiber composites. I plan to keep this book on reserve at the library as a reference for the course.

Reviewer: Erik Thostenson *of the Department of Mechanical Engineering and Center for Composite Materials at the University of Delaware.*

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